

Citation:

Baines S, Powers J, Brown WJ. How does the health and well-being of young Australian vegetarian and semi-vegetarian women compare with non-vegetarians? *Public Health Nutr.* 2007 May;10(5):436-42.

PubMed ID: [17411462](#)

Study Design:

Cross-sectional Analysis of Cohort Study

Class:

D - [Click here](#) for explanation of classification scheme.

Research Design and Implementation Rating:

POSITIVE: See Research Design and Implementation Criteria Checklist below.

Research Purpose:

To explore differences in sociodemographic characteristics, health status and health service use in a representative sample of young Australian women who were defined as vegetarian, semi-vegetarian and non-vegetarian.

Inclusion Criteria:

- Participants in the Australian Longitudinal Study on Women's Health
- Women aged 22 - 27 years

Exclusion Criteria:

None specifically mentioned.

Description of Study Protocol:**Recruitment**

- Data from Australian Longitudinal Study on Women's Health, a large national study investigating the health and well-being of women over a 20-year period.
- Women were randomly selected from the national health insurance database (Medicare) that includes all permanent residents of Australia, with over-representation of women living in rural and remote areas, as well as women with higher levels of education
- 14,247 respondents completed Survey 1 in 1996
- 9,689 respondents completed Survey 2 in 2000
- Analyses are based on Survey 2, the only survey to include questions about the exclusion of red meat, poultry and fish

Design: Cross-sectional Analysis of a Cohort

Blinding used (if applicable): not applicable

Intervention (if applicable): not applicable

Statistical Analysis

- Means and confidence intervals were calculated for continuous variables using the least-squares means option of the generalized linear models procedure
- Differences in proportions for categorical variables were tested using the chi-square test
- Post hoc analyses were conducted to determine differences between semi-vegetarians, vegetarians and non-vegetarians
- Bonferroni corrections were used to maintain an overall significance level of 0.05

Data Collection Summary:

Timing of Measurements

One-time measurements from Survey 2 in 2000, a self-completed postal questionnaire.

Dependent Variables

- Sociodemographic characteristics: area of residence, marital status, educational qualifications, income
- Physical activity
- Smoking status
- Alcohol consumption
- Height and weight based on self-report
- Health status based on Medical Outcomes Study Short Form Health Survey (SF-36)
- Health service use: general practitioner visits, medications

Independent Variables

- Non-vegetarians: reported including red meat in their diet
- Semi-vegetarians: excluded red meat from their diet
- Vegetarians: excluded meat, poultry and fish from their diet

Control Variables

- Area-adjusted to correct for oversampling of women from rural and remote areas

Description of Actual Data Sample:

Initial N:

- 14,247 respondents completed Survey 1 in 1996
- 9,689 respondents completed Survey 2 in 2000

Attrition (final N): 9113 women from Survey 2 included in the analysis - respondents to the question about exclusion of red meat, poultry or fish from the diet.

Age: aged 22 - 27 years in 2000

Ethnicity: not described

Other relevant demographics:

Anthropometrics

Location: Australia

Summary of Results:

Key Findings

- Vegetarians and semi-vegetarians had lower BMI (mean 22.2, 95% confidence interval: 21.7 - 22.7; mean 23.0, 95% confidence interval: 22.7 - 23.3 kg/m²) than non-vegetarians (mean 23.7, 95% confidence interval: 23.6 - 23.8 kg/m²) and tended to exercise more
- Non-vegetarians, semi-vegetarians and vegetarians did not differ in their self-reported physical health
- Semi-vegetarians and vegetarians had poorer mental health, with 21 - 22% reporting depression compared with 15% of non-vegetarians ($P < 0.001$).

Variables	Statistical Significance of Group Difference
Urban residence (%)	<0.001
Marital status (%)	<0.001
Educational qualifications (%)	<0.001
Annual income (%)	0.002
Physical activity in the last week (%)	<0.001
Total hours sitting in the last week (%)	0.520
BMI	<0.001
Smoking status (%)	0.008
Alcohol consumption	0.146
Physical Component Summary Score	0.671
Mental Component Summary Score	<0.001
Number of visits to practitioner in the last year (%)	0.796
Consulted allied health professional in last year (%)	0.630

Consulted alternative health practitioner in last year (%) <0.001

Number of prescription medications taken in last 4 weeks (%) <0.001

Other Findings

- The estimated prevalence was 3% and 10% for vegetarian and semi-vegetarian young women
- Compared with non-vegetarians, vegetarians and semi-vegetarians were more likely to live in urban areas and to not be married
- Low iron levels and menstrual symptoms were more common in both vegetarian groups
- Vegetarian and semi-vegetarian women were more likely to consult alternative health practitioners and semi-vegetarians reported taking more prescription and non-prescription medications
- Compared with non-vegetarians, semi-vegetarians were less likely and vegetarians much less likely to be taking the oral contraceptive pill

Author Conclusion:

In conclusion, vegetarian and semi-vegetarian young women appear to be different from non-vegetarians in terms of healthier body weight and physical activity, but less healthy in terms of smoking tobacco (semi-vegetarians). The data are strongly suggestive of poorer mental health among non meat-eaters, as evidenced by several indicators, including the SF-36, reporting of diagnoses and symptoms, and greater use of medications for mental health problems. Vegetarian and semi-vegetarian women also report more menstrual symptoms, including irregular periods, severe period pain and premenstrual tension. Future studies of this cohort will attempt to untangle the relationships between meat-eating and some of the health problems reported here.

Reviewer Comments:

Authors note that cohort over-represented women living in rural and remote areas, as well as women with higher levels of education. All data, including height and weight, based on self-report.

Research Design and Implementation Criteria Checklist: Primary Research

Relevance Questions

- | | | |
|----|---|-----|
| 1. | Would implementing the studied intervention or procedure (if found successful) result in improved outcomes for the patients/clients/population group? (Not Applicable for some epidemiological studies) | N/A |
| 2. | Did the authors study an outcome (dependent variable) or topic that the patients/clients/population group would care about? | Yes |

3.	Is the focus of the intervention or procedure (independent variable) or topic of study a common issue of concern to nutrition or dietetics practice?	Yes
4.	Is the intervention or procedure feasible? (NA for some epidemiological studies)	N/A

Validity Questions

1.	Was the research question clearly stated?	Yes
1.1.	Was (were) the specific intervention(s) or procedure(s) [independent variable(s)] identified?	Yes
1.2.	Was (were) the outcome(s) [dependent variable(s)] clearly indicated?	Yes
1.3.	Were the target population and setting specified?	Yes
2.	Was the selection of study subjects/patients free from bias?	Yes
2.1.	Were inclusion/exclusion criteria specified (e.g., risk, point in disease progression, diagnostic or prognosis criteria), and with sufficient detail and without omitting criteria critical to the study?	Yes
2.2.	Were criteria applied equally to all study groups?	N/A
2.3.	Were health, demographics, and other characteristics of subjects described?	Yes
2.4.	Were the subjects/patients a representative sample of the relevant population?	Yes
3.	Were study groups comparable?	Yes
3.1.	Was the method of assigning subjects/patients to groups described and unbiased? (Method of randomization identified if RCT)	Yes
3.2.	Were distribution of disease status, prognostic factors, and other factors (e.g., demographics) similar across study groups at baseline?	Yes
3.3.	Were concurrent controls used? (Concurrent preferred over historical controls.)	Yes
3.4.	If cohort study or cross-sectional study, were groups comparable on important confounding factors and/or were preexisting differences accounted for by using appropriate adjustments in statistical analysis?	Yes
3.5.	If case control or cross-sectional study, were potential confounding factors comparable for cases and controls? (If case series or trial with subjects serving as own control, this criterion is not applicable. Criterion may not be applicable in some cross-sectional studies.)	Yes

3.6.	If diagnostic test, was there an independent blind comparison with an appropriate reference standard (e.g., "gold standard")?	N/A
4.	Was method of handling withdrawals described?	Yes
4.1.	Were follow-up methods described and the same for all groups?	Yes
4.2.	Was the number, characteristics of withdrawals (i.e., dropouts, lost to follow up, attrition rate) and/or response rate (cross-sectional studies) described for each group? (Follow up goal for a strong study is 80%.)	Yes
4.3.	Were all enrolled subjects/patients (in the original sample) accounted for?	Yes
4.4.	Were reasons for withdrawals similar across groups?	N/A
4.5.	If diagnostic test, was decision to perform reference test not dependent on results of test under study?	N/A
5.	Was blinding used to prevent introduction of bias?	No
5.1.	In intervention study, were subjects, clinicians/practitioners, and investigators blinded to treatment group, as appropriate?	N/A
5.2.	Were data collectors blinded for outcomes assessment? (If outcome is measured using an objective test, such as a lab value, this criterion is assumed to be met.)	No
5.3.	In cohort study or cross-sectional study, were measurements of outcomes and risk factors blinded?	No
5.4.	In case control study, was case definition explicit and case ascertainment not influenced by exposure status?	N/A
5.5.	In diagnostic study, were test results blinded to patient history and other test results?	N/A
6.	Were intervention/therapeutic regimens/exposure factor or procedure and any comparison(s) described in detail? Were intervening factors described?	Yes
6.1.	In RCT or other intervention trial, were protocols described for all regimens studied?	N/A
6.2.	In observational study, were interventions, study settings, and clinicians/provider described?	Yes
6.3.	Was the intensity and duration of the intervention or exposure factor sufficient to produce a meaningful effect?	N/A
6.4.	Was the amount of exposure and, if relevant, subject/patient compliance measured?	N/A
6.5.	Were co-interventions (e.g., ancillary treatments, other therapies) described?	N/A
6.6.	Were extra or unplanned treatments described?	N/A

6.7.	Was the information for 6.4, 6.5, and 6.6 assessed the same way for all groups?	N/A
6.8.	In diagnostic study, were details of test administration and replication sufficient?	N/A
7.	Were outcomes clearly defined and the measurements valid and reliable?	Yes
7.1.	Were primary and secondary endpoints described and relevant to the question?	Yes
7.2.	Were nutrition measures appropriate to question and outcomes of concern?	Yes
7.3.	Was the period of follow-up long enough for important outcome(s) to occur?	N/A
7.4.	Were the observations and measurements based on standard, valid, and reliable data collection instruments/tests/procedures?	Yes
7.5.	Was the measurement of effect at an appropriate level of precision?	???
7.6.	Were other factors accounted for (measured) that could affect outcomes?	No
7.7.	Were the measurements conducted consistently across groups?	Yes
8.	Was the statistical analysis appropriate for the study design and type of outcome indicators?	Yes
8.1.	Were statistical analyses adequately described and the results reported appropriately?	Yes
8.2.	Were correct statistical tests used and assumptions of test not violated?	Yes
8.3.	Were statistics reported with levels of significance and/or confidence intervals?	Yes
8.4.	Was "intent to treat" analysis of outcomes done (and as appropriate, was there an analysis of outcomes for those maximally exposed or a dose-response analysis)?	N/A
8.5.	Were adequate adjustments made for effects of confounding factors that might have affected the outcomes (e.g., multivariate analyses)?	Yes
8.6.	Was clinical significance as well as statistical significance reported?	Yes
8.7.	If negative findings, was a power calculation reported to address type 2 error?	N/A
9.	Are conclusions supported by results with biases and limitations taken into consideration?	Yes
9.1.	Is there a discussion of findings?	Yes
9.2.	Are biases and study limitations identified and discussed?	Yes
10.	Is bias due to study's funding or sponsorship unlikely?	Yes

10.1.	Were sources of funding and investigators' affiliations described?	Yes
10.2.	Was the study free from apparent conflict of interest?	Yes

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